

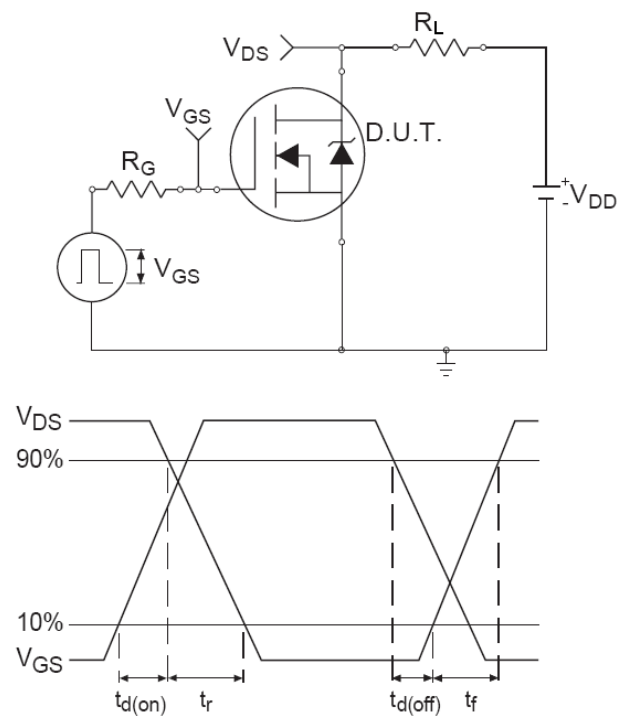
Features

- $V_{DS}=40V/V_{GS}=\pm 20V/I_D=130A$
 $R_{DS(ON)}=4m\Omega(max.)@V_{GS}=10V$
- High Dense Cell Design
- Reliable and Rugged
- Advanced trench process technology
- High Density Cell Design For Ultra Low On-Resistance

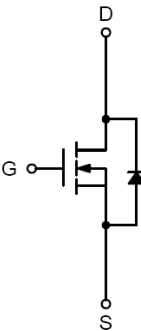
Applications

- Power Management in Inverter System
- Synchronous Rectification

Switching Time Test Circuit and Waveforms



Pin Description



Marking and pin Assignment



TO-220-3L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM1404B	HM1404B	TO-220-3L	-	-	-

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Symbol	Parameter	Typical	Unit
V _{DSS}	Drain-Source Voltage	40	V
V _{GSS}	Gate-Source Voltage	±20	V
I _D	Continuous Drain Current	T _C =100°C 100 130	A A
I _{DP}	300us Pulsed Drain Current Tested	T _C =25°C 300	A
I _S	Diode Continuous Forward Current	30	A
T _J	Operating Junction Temperature	150	°C
T _{STG}	Storage Temperature Range	-55 ~ 150	°C

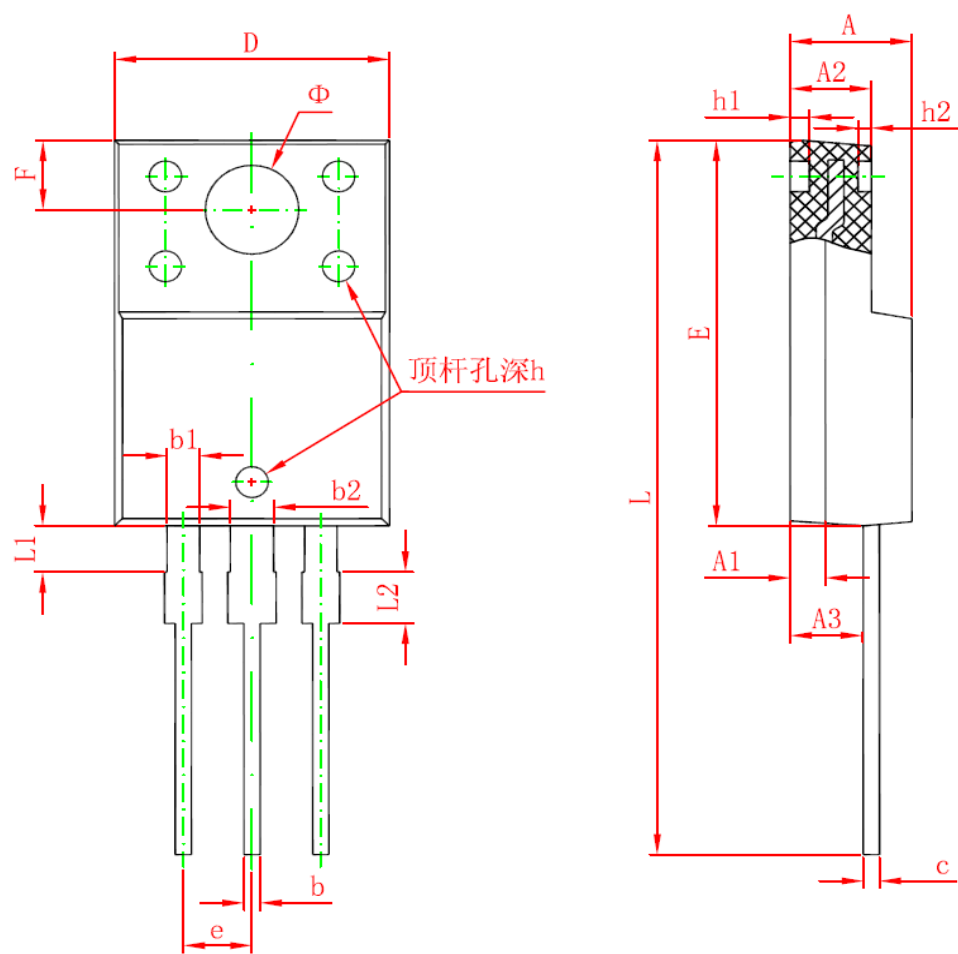
Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, V _{GS} =0V T _J =85°C			100 1	uA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1	2	3	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
R _{DS(on)} ¹	Drain-Source On-Resistance	V _{GS} =10V, I _D =30A		3.2	4	mΩ
Diode Characteristics						
V _{SD} ¹	Diode Forward Voltage	I _{SD} =30A, V _{GS} =0V		0.85	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =30A, dI _{SD} /dt=100A/us		50		ns
Q _{rr}	Reverse Recovery Charge			90		nC
Dynamic Characteristics ²						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Frequency=1MHz		1.5		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V Frequency=1MHz		4500		pF
C _{oss}	Output Capacitance			800		
C _{rss}	Reverse Transfer Capacitance			240		
t _{d(on)}	Turn-On Delay Time	V _{DD} =20V, R _L =30Ω I _D =1.0A, V _{GEN} =10V R _G =6Ω		19		ns
t _r	Turn-On Rise Time			14		
t _{d(off)}	Turn-Off Delay Time			60		
t _f	Turn-Off Fall Time			35		
Gate Charge Characteristics ²						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V I _D =30A		85		nC
Q _{gs}	Gate-Source Charge			30		
Q _{gd}	Gate-Drain Charge			23		

Note:

- 1: Pulse test ; pulse width ≤ 300ns, duty cycle ≤ 2%.
- 2: Guaranteed by design, not subject to production testing.

TO-220F PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.700	0.169	0.185
A1	1.300 REF.		0.051 REF.	
A2	2.800	3.200	0.110	0.126
A3	2.500	2.900	0.098	0.114
b	0.500	0.750	0.020	0.030
b1	1.100	1.350	0.043	0.053
b2	1.500	1.750	0.059	0.069
c	0.500	0.750	0.020	0.030
D	9.960	10.360	0.392	0.408
E	14.800	15.200	0.583	0.598
e	2.540 TYP.		0.100 TYP.	
F	2.700 REF.		0.106 REF.	
Φ	3.500 REF.		0.138 REF.	
h	0.000	0.300	0.000	0.012
h1	0.800 REF.		0.031 REF.	
h2	0.500 REF.		0.020 REF.	
L	28.000	28.400	1.102	1.118
L1	1.700	1.900	0.067	0.075
L2	1.900	2.100	0.075	0.083